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ARE MENTAL PROCESSES IN SPACE?

EVENTS or processes may be divided into those that exist and those that do not. Existent processes are those that occur somewhere, non-existent are those that occur nowhere. The existent is in short that to which the Aristotelian category *που* has a positive application. To the truth of this view most modern philosophers admit a curious exception. Feeling and thinking, they tell us, actually occur, but they are unique among real occurrences in that they occur nowhere. Space is filled with the physical, with matter and motion, and no room can be found in it for the psychical, which, as such, is certainly neither matter nor motion. Now, when a philosophical theory is greatly at variance with common sense, it is always worth while to re-examine the evidence upon which it rests. My purpose in this paper is to undertake that re-examination, and I hope to show as a result, that there is room in space for the psychical as well as for the physical and that the prevailing notion that feelings can both exist and exist nowhere is not only paradoxical but false.

The reasons which influence the ordinary man to locate consciousness inside the body of the one who is conscious, are both direct and inferential—direct in his own case, indirect in the case of others. Each one naturally regards his thoughts and feelings and volitions as taking place in his mind, and he locates his mind in his body. It can not be denied, however, that things often appear to be where they are not, so we may pass over this introspective evidence for locating our own minds in our bodies, and proceed to the second or indirect argument for the belief that the minds of other persons are within their bodies.

This argument is very simple. There are in the world a number of phenomena the loci of which we cannot directly perceive. We assign these phenomena their locations in accordance with a rule to which, so far as I am aware, no exception has ever been found. The rule is this: Every invisible thing is in the same place as the visible thing which varies directly and immediately with it. Electricity, though in itself invisible, is located in the battery and wires on which it is found to depend. Gravitative attraction between masses is located in the masses and in the space between them, because it varies immediately with the masses and with the space between them. Now we locate the invisible mental processes of other persons in their visible bodies because, while thinking and feeling vary indirectly with many things, notably the external objects thought about and felt, they vary directly and immediately with only one system of objects—viz., the central nervous system of their owner. So when the plain man shocks us by saying that his mental processes go on "inside his head," let us remember that he is only applying to one series of events a rule which has always proved valid for the location of every other series of events.

Turning now to the arguments urged by the philosopher against this position, we find what seem to be three distinct lines of attack which for convenience we shall call the transcendental, the introspective and the empirical.

The first or transcendental argument aims to demonstrate the non-spatiality of the psychical as a direct consequence of the doctrine of transcendental idealism. Space, we are told, is an appearance; consciousness is an absolute and eternal reality. We could not locate consciousness in space without subordinating reality to one of its appearances. To this we may answer that no one desires to locate the transcendental consciousness in space and still less in his brain. That eternal ego, in which the idealist believes, can remain the support or condition not only of space but of time. Our concern is wholly with the empirical consciousness, or with those cognitive, conative and affective processes which are admitted by everybody to be in time and to depend upon the brain. No disrespect is done to the eternal consciousness by locating the empirical consciousness in time; and as space is for the transcendentalist no worse an appearance than time, he cannot plead that the location of mental processes in space is incompatible with the general doctrine of transcendental idealism.

But, secondly, it is objected that introspection affords us an immediate intuition of the spacelessness of our mental states. For, it is said, if our sensations exist in space they will appear either as punctiform or as definitely extended and separated from one another by a definite number of feet or inches. Now we intuit our sensations neither as punctiform nor as figured, therefore they exist nowhere. This familiar argument seems plausible enough, until we notice the absurdity of the major premise. The dilemma it presents to us as based upon experience is in flat violation of all experience except the visual and tactual. I do not feel a pain in my foot either as punctiform or as square or as distant so many inches from a pressure in the same spot. Yet I none the less locate it in a certain part of space, namely, in my foot. The odor of a flower, the sound of a bell, the soft stickiness of molasses, are all definitely located in space, so far as immediate experience goes, but a question as to whether they were felt as square or triangular or punctiform would be regarded as foolish. It is only with color, and to a less extent with solidity, that spatiality and figure are indissolubly associated. And as for the mentioned non-spatiality of the *relations between* mental processes, experience offers countless instances of relations equally non-spatial but which subsist between things about whose existence in space there is no question. Such, for example, are the relations of likeness and difference, harmony and dissonance, etc.

The third argument against locating mental processes in space has been in use since the time of Leibnitz. It is based on the actual or possible testimony of our external senses. The argument runs thus. When we look at the brain of a conscious being, we fail entirely to see the thoughts and feelings of that being. We find only the matter of which the brain is composed. Nor can we feel that this failure is due to the defects of our eyesight. For if we imagine ourselves to possess microscopes so transcendently powerful as to reveal the very atoms themselves, we believe with the utmost confidence that these atoms and their motions would be all that there would be to see. We can in no wise fancy how a sensation would look wedged in between two molecules. We reject such a possibility on much the same grounds that we reject the possibility of a round square. It is the essence of the psychical to be private in the sense of being inaccessible to external perception. The physically visible object is, on the other hand, a public or externally perceptible event. Visible space is filled with the physical, and there is no room in it for the psychical events, which are consequently non-spatial.

It must be confessed that this argument usually carries conviction, and it is certainly far stronger than either the appeal to transcendental idealism or the proof from introspection. Put in the form of a syllogism, the argument reads as follows:

(1) Whatever is from its very nature incapable of being an object for vision or for any of the external senses is not in space. (2) Consciousness is from its very nature

essentially private or incapable of being perceived externally. (3) Therefore consciousness is not in space. Granting the formal validity of this syllogism and the truth of the minor premise, let us question the truth of the major premise. Could we not conceive of something located in space, and yet incapable of being perceived by an external observer? Objects, in order to be perceived by us, must impress our sense organs with some form of kinetic energy. Kinetic energy is a public fact, externally accessible to many observers, but potential energy, which is admitted to be in space, can only be externally perceived by passing into a kinetic state, that is, by ceasing to be itself. To feel it as it is, we must participate in it. To perceive a stress, our muscles must undergo stress, just as to perceive a pain or pleasure, we must be pained or pleased. In short, the peculiar inaccessibility of mental processes to all modes of external perception is shared by potential energy, and is consequently no evidence of spacelessness.[1]

At this point, however, a vigorous objection may be made to the way in which we are using the concept potential energy. Potential energy, so we shall be told, means one of two things, either of which would vitiate any analogy between it and the psychical. According to some, potential energy is nothing actual at all, but simply the possibility of motion. An elastic ball collides with a fixed object, loses its motion in one direction, and then resumes the same amount of motion in the opposite direction. As the ball cannot move back until it has ceased to move forward, it must inevitably pass through a moment in which there is no motion at all. At this moment all the kinetic energy has been transformed into potential energy. If we define this potential energy as a bare possibility of future motion and as nothing in itself actual and present, we shall have to admit that motion can pass into nothing and can come from nothing, and that this happens whenever and wherever the direction of a motion is changed, and that the nonentities into which motions pass possess the miraculous power of recreating quantities of motion exactly equal to those that were annihilated. I think it will be admitted that such beliefs constitute a pretty severe strain on even the most radically empirical of imaginations; and, as a matter of fact, the second conception of potential energy is the more defensible. According to this conception potential energy is only kinetic energy on a scale too small to be visible to the senses. The motion of the elastic body as a whole is, upon impact with another body, converted into some kind of imperceptible motion of its parts, and these minute motions which make up what we call potential energy, are in turn re-converted into visible motion of the body as a whole. The difficulty with this conception, however, is at once manifest when we try to imagine how these invisible particles are to lose *their* motion in one direction and regain it in an opposite direction without passing through a phase in which there is no velocity in either direction, but only acceleration or stress—the actual reality into which past motion has been converted and from which future motion will arise.

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[1] The second and third arguments in favor of the spacelessness of consciousness are more closely related than may at first appear. They each assume that a thing, in order to fill space, must fill it *extensively*, as matter fills it, and must consequently be (1) figured, and (2) externally perceptible, neither of which attributes can be ascribed to consciousness. Both arguments neglect the possibility that consciousness may occupy space *intensively*, as the force of gravity between two planets or the stress in a watch-spring, and hence be neither figured nor perceptible through the external senses. For example, if any one were to demand that an acceleration either be proved to have a definite figure and to be visible through a microscope alongside of the particles of the accelerated body, or else be treated as not in space at all, we should unhesitatingly regard the proposed dilemma as absurd, in that it assumed that the intensive occupancy of space by a force was the same as the extensive occupancy of space by a body.

And now that we have seen that potential energy and consciousness resemble each other in what is for each the distinguishing point of inaccessibility or intransmissibility, a hypothesis suggests itself that they are identical, that what we know directly from within as the psychical or subjective side of experience may be the same as what we know indirectly from without as the potential energy of the nerve currents in the brain. A line of thought somewhat similar to this was suggested by Kant in his treatment of intensity and of the dynamic theory of matter. It was more than suggested by Herbart. Lotze somewhere speaks of the possibility of describing the action of body on mind as the passing over of energy into intensive states of the real. Karl Pearson says, in his *Grammar of Science,* that stored sense-impresses may be modes of brain strain. Ostwald feels that energy is the most hopeful concept for uniting the physical and psychical. In fact, ever since the time of Leibnitz, there has existed an undercurrent of thought along this line.

Let us consider for a moment some of the advantages that would result from conceiving psychical processes as modes of potential energy. Most of us have probably felt at one time or another a pang of regret that the conventional statement of materialism was so easily refuted. It would be such a simplification of the psychophysical problem if consciousness were a mode of motion. The theory wants nothing but truth. Unfortunately we know motion and we know consciousness, and they are obviously different both in themselves and in their manner of behavior. We cannot, however, so easily dismiss the proposition that consciousness is a mode of potential energy. It may be said that the experience of stress or strain is not any more like the psychical in general than is the experience of motion. We must remember, however, that as velocity can be transformed into energy of acceleration, so acceleration can pass into the second derivative of the velocity. *The modes of potential energy into which nerve currents and other motions can pass include in addition to acceleration, the whole endless series of higher derivatives of space with* *regard to time, and in these purely intensive magnitudes and their mutual relations and combinations we have a system which is sufficiently rich and complex to express the manifoldness and multidimensionality of psychic life.*

We know that the intensity of a sensation is, according to the law of relativity, determined not merely by the energy of the nerve current induced by the physical stimulus, but by the relation of that current to other currents already present in the brain. So the intensity of a mode of potential energy is similarly determined by the degree of opposition of one mode of kinetic energy to another. We know that the general intensity of consciousness is proportional to the tension, redirection and readjustment that is necessary. The reactions that are smooth tend to become habitual and unconscious. But the degree of redirection which a nerve-current undergoes at a given nerve center, varies concomitantly with the intensity of the phase of potential energy through which it passes at that center; for, as we have seen, motion in one direction must be transformed into the potential energy of stress before it can reissue as motion in an opposite direction. Finally, we may note that the protoplasmic structure with which consciousness is associated is noted among all other material structures for its power to store up and accumulate potential energy from the streams of kinetic energy that are fed to it by its environment.

Many more analogies like the above might be adduced as direct evidence for the truth of the hypothesis that psychical processes exist in space as modes of potential energy of the nervous system. In closing, however, I wish to mention by way of indirect evidence the bearing of this hypothesis upon the dispute between parallelism and interactionism.

Both parallelist and interactionist assume that the mind is not in space. The interactionist declares that he will trust the evidence of experience and common sense to justify his belief in causal interaction between mind and body. The parallelist, on his side, declares that he will trust his scientific instinct to justify him in rejecting any causal relation between a body that is in space and a mind that is out of it. Is it not clear that if consciousness could be identified with the intensive or potential energy which is actually present though invisible in the brain, the two sides would cease to dispute, and each could claim to have been right? There would be no impossible interaction of a spatial body and a non-spatial mind, and yet a nerve current would really cause a sensation as truly and in the same manner as motion in a body causes stress in the body with which it collides; and a psychical volition would really cause a physical action as truly and in the same manner as the tension in a bow causes the flight of an arrow. In every case of sensation nature would perform an operation of differentiation, transforming energy from the kinetic phase of MV^2 into the potential phase of MAS. Similarly, in every case of intelligent volition, nature would integrate the differential equations of a psychosis, transforming the energy of acceleration and the higher derivatives back into the visible and physical energy of motion.

In short, the existence of mental processes in space would seem to be equally a postulate of common sense and a desideratum of psychophysical method.

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